Space Weather Forecast

Issued on Sunday, 09 January 2022 at 12:21 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Increasing slight chance of Moderate-class flares (R1-R2 radio blackouts).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was Very Low over the past 24 hours, with only very minor flares. There are currently four sunspots on the visible disc. The most notable is a large region near the southern centre disc, which has shown some slight increase in magnetic complexity. The other three spots are all small and simple, although the region near the southeast limb is still foreshortened making classification a little uncertain. There is an area of magnetic complexity which has rotated onto the northeast limb which shows a fair amount of magnetic flux, but no spots at present, and will be monitored.
No confirmed Earth-directed Coronal Mass Ejections (CMEs) have been observed in currently available imagery. A prominence liftoff near the southwest limb has yet to be analysed, although this is currently considered unlikely to be Earth-directed.

Solar Wind / Geomagnetic Activity: Solar winds showed an increase in activity, prior to entry into the expected fast wind from a coronal hole. Solar wind speeds were steady at around 300km/s, before rising steadily from 08/1700 UTC to reach elevated levels around 530 km/s. The Interplanetary Magnetic Field was weak to start, becoming moderate to strong from 08/1700 UTC, before declining back to weak levels after 09/0700 UTC. The important north-south component was weakly southward directed to start, then started to vary strongly from 08/1700 UTC, before becoming nearer neutral after 09/0700 UTC. Geomagnetic activity was Quiet to start, becoming Unsettled to Active with a G1/Minor Storm (Kp5) observed in the 21-00UTC interval, before becoming Quiet again from 09/0300 UTC.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to remain Low or Very Low, with further Common-class flares possible. In addition, there is an increasing daily Slight Chance of Moderate-class flares, as several returning regions are expected to rotate onto the visible disc over the coming days.

Solar Wind / Geomagnetic Activity: There are currently no Earth-directed CMEs in the forecast. We currently have elevated wind speeds from a coronal hole, which are expected to slowly ease through Day 2 into Day 3 (10-11 Jan). Geomagnetic activity is likely to be Quiet to Unsettled, with a chance of Active intervals through Day 1 (09 Jan) and into Day 2. The likelihood of further G1/Minor Storm intervals is now considered very low. Activity is then expected to be mainly Quiet through Days 3 and 4 (11-12 Jan).

Energetic Particles / Solar Radiation: No solar radiation storms are expected, although there is a very slightly increasing risk with the westward progression of the current front-sided sunspots.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	5	1	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	10	10	15	20
Very Active	R3 to R5 X	No	1	1	1	2

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	1	2	2	2
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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